AMAT100: PreCalculus
Worksheet 5

Due: Announced In Class or Digitally

—— Instructions ——

- This homework should be submitted in class or digitally on the date listed above.
- **You must show all work**. You may receive zero or reduced points for insufficient work. **Your work must be neatly organised and written**. You may receive zero or reduced points for incoherent work.
- If you are writing your answers on anything other than this sheet, you should only have **one question per page**. You can have parts a), b) and c) on the page for example, but problems 1) and 2) should be on separate pages.
- **Put a box or circle around your final answer** for each question.
- The problems on this assignment will be **graded on correctness and completeness**.
- These problems are designed to be done without a calculator. Whilst there is nothing stopping you using a calculator when working through this assignment, be aware of the fact that you are not permitted to use calculators on exams so you might want to practice without one.

1. (Optional or Extra Credit) A big pine tree has grown so that it is tilted 3° from vertical toward the sun. When its shadow is 20 ft long, the angle of elevation from the tip of its shadow to the top of the tree is 60°. Approximately how tall is the tree? (i.e. what is its length)?

2. (Optional or Extra Credit) A person leaves his house and walks 2 miles west and then 4 miles northwest. Approximately how far is he from home?

3. (Optional or Extra Credit) Given a triangle with sides $a = 6$, $b = 8$, and $c = 11$, find opposite angles A, B, and C.

4. Using the double angle formulas, calculate $2\sin(12^\circ)\cos(12^\circ)$.

5. Use the sum and difference formulas to solve the problems below.

   (a) Calculate $\cos(57°)\cos(22°) - \sin(57°)\sin(22°)$.

   (b) Suppose $\cos\alpha = \dfrac{3}{5}$ and $\sin\beta = \dfrac{5}{13}$, where α is in quadrant I and β is in quadrant II. Find $\sin(\alpha + \beta)$.